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AUTHOR Vidulich, Robert N.; And Others
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ABSTRACT

This paper briefly summarizes four years of research on career decisions in a large sample (997) of high-ability women. The research focused on career choice and career choice change in these young women during the time when these decisions were being made. A variety of background questions were included in the survey instrument, including family size, high school size, socio-economic background, parents' educational attainments and sex-role atypicality of the mothers' occupations. Results indicate: (1) change in career planning is common in these women; (2) the extent of change varies by the area of early career choice; and (3) changes in original career decisions typically occur early in college. (Author/BMV)

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CAREER CHOICE AND CHANGE IN HIGH-ABILITY YOUNG WOMEN

Robert N. Vidulich, Diane G. Sachs,
and John F. Christman

In our allotted fifteen minutes today, we will be able to present only some broad conclusions about a small portion of almost four years of research on career decisions in a very large sample of high-ability women. This research has been supported by the National Science Foundation which has been increasingly concerned with the recruitment of talented women to medicine, the sciences, mathematics, and engineering. Our concern has been with career choice and career choice change in high ability young women during the time when these decisions are being made.

While we have no direct measures of their intellectual capabilities, such as IQ, there is no question that our primary sample of 997 young women is indeed of very high ability. 26% of these women graduated first in their high school class, another 34% finished in the top 5 graduates, and still another 33% were among the top 10% of their class. Only 7% graduated from high school in the bottom 90% of their class! Or consider another criterion of high ability: of the 406 women in this sample who had been out of high school long enough when the initial data were collected in 1975 to have finished at

least four years of college, only 2 had not attended college, and only 29 had quit college without a degree. 92% had finished undergraduate school at that point, and of these, 62% had already started graduate or professional training. Almost 1/3 had already completed a terminal graduate degree in science, medicine, engineering, law, mathematics-computers, or education. Most of those still in undergraduate school were intending to pursue advanced degrees. Over 58% have attended some of the most highly rated and prestigious schools in the country. Obviously, this group of women is not a random sample of American females, in intellectual abilities, career interests, motivation, or achievement -- present or potential.

Where did we get such an unique sample? In the Fall of 1975, following about nine months of preparation, a lengthy survey instrument was mailed to 1,189 women who had been carefully pre-selected as potential research subjects. Each had been a participant in one of thirteen Student Science Training Programs (or SSTPs) at some time during the 10-year period 1965-1974. SSTP is a NSF-supported accelerated summer collegiate level training experience for competitively selected high school students designed to provide an enriched exposure to some area of science, mathematics-engineering, or medicine. SSTP was seen by us as providing an unique research population of highly motivated and intellectually able young women with

strong career interests usually, but not necessarily, in a science related area, in whom high-level career choice and career change decisions could be investigated.

The 997 young women who completed and returned the survey instrument in late 1975 comprise one of several samples in our research project and will be discussed today. They represent an incredible 84% return rate of the women contacted by the mail survey. In addition to the data originally collected from these 997 women, from which our cross-sectional comparisons of early and expected career choice are drawn, we are continuing to collect longitudinal data on the career related activities of these women.

From information reported by these 997 subjects about their lives and backgrounds, we have developed a variety of quantitative sociological measures including parents' ages when the daughter was born; family size and subject's birth order; size of hometown during adolescence; high school size, and rank in the high school graduating class; parents' socio-economic status, including measures of both the mothers' and the fathers' educational attainments and occupations; and the sex-role atypicality of the mothers' occupations. Additionally, their responses to the 75 most discriminating survey questions, derived from pilot interviews with groups from the subject population, were subjected to factor analysis, and 25 factor scores for each subject were derived. These

factor scores quantify personal characteristics which can be related to career decisions, and some of these will be discussed in a moment.

All but a handful of these young women have aspired to the following seven broad career areas: medicine; the natural and the social-behavioral sciences; mathematics/computer analysis/engineering; the arts and humanities; law/business/government; the health-related professions (such as nursing or medical technology); or elementary or secondary teaching. It is the early career aspirations of these young women to which we shall now turn.

The career decisions made by these young women by the end of their junior year in high school are very significantly related to some social and personal factors, but not to others. Such background characteristics as parents' ages relative to the daughter, family size, subject's birth order, or rank in the high school graduating class are <u>not</u> predictive of <u>early</u> career decisions. However, their parents' socio-economic status, the type of community in which they spent their teen years, and the size of their high school <u>are</u> important.

For example, girls whose parents have graduate training or terminal academic or professional degrees and who are employed in professional, scientific, or managerial-executive positions are much more likely to aspire to careers in

medicine while in high school. At the other extreme of socio-economic level, daughters of less well educated parents employed in lower status occupations (especially parents without a high school education) are much more likely to be attracted early to careers in the health-related professions or in elementary or secondary teaching. Parents' education and occupation have little relationship in this sample, however, to early career choices in the sciences, in mathematics-computers-engineering, in the arts and humanities, or in law-business-government; young women aspiring to careers in these areas while in high school come about equally from all levels of parents' socio-economic status.

Parenthetically, it is interesting to note that we have found very little evidence in this sample to support the often-stated hypothesis that an employed mother provides a positive role model for her daughter's occupational aspirations. While this may be true for the population of women at large, in this sample where practically <u>all</u> of these young women aspire to careers requiring higher educational training, the specific career choices of high-ability daughters of working mothers are little different from those of daughters of mothers who are housewives only. What we do find is that the sex-role atypicality of the mothers' occupations does make a significant difference for <u>early</u> career decisions: daughters of mothers with occupations unusual for women in our society much more

frequently aspire in high school to careers in medicine (but not other career areas), while those whose mothers work in "typical" jobs for women more frequently aspire early to be school teachers.

As we have just noted, high-ability girls choosing careers early in the sciences and in mathematics-computers-engineering come about equally from the total range of parents' educational-occupation position. Therefore, it is of even greater interest to discover that early career aspirations in these areas are very significantly related to the type and size of the girls' hometowns, and to the size of the high schools they attended. Far more of those raised in suburban communities of small-to-moderate size (from 10,000 to 50,000 population) aspired while in high school to careers in medicine, the sciences, or math-computers-engineering than is true of girls from rural areas or non-suburban small towns, or from larger cities, who two to three times as often aspire to careers in nursing, medical technology, or teaching.

Similarly, the size of the high school attended is, by itself, very important for early career choice: women from larger high schools, with more than 250 students in the graduating class, are about twice as likely to aspire to careers in the sciences as equally high-ability girls from high schools with fewer than 100 graduates per year. Conversely, a far larger proportion of high-ability girls from

smaller high schools aspire early to careers in teaching or the health-related professions. The variables operating in these relationships remain to be specified by follow-up surveys, but probably include differences in adequacy of career counseling, differences in the quality of science facilities and instruction, and differences in the peer and faculty influences on career role expectation in schools of differing size.

Page 1 of the handout names those personal factors identified by the factor analysis of 75 questionaire items which characterize each early career choice sub-group. It is clear that the girls aspiring while in high school to each career area share some common personal attributes and qualities, and that these attributes vary widely from one career area to another. We shall return to a brief discussion of these factors in a moment.

Turning to changes in career decisions, several important generalizations can be made about career choice change in this sample:

First, change in career planning is common and not unusual, even among these high-ability young women. Of those 765 girls who had made a career decision by the end of their junior year in high school, 58% had decided to go into another career area by the time they had finished college or stopped their education -- 38% making two career changes, and 20%

switching career choices three or more times before finally settling on a career area. Only 18% of the 765 had never swerved from their original career decision made in high school.

Second, the extent of change varies by the area of early career choice. 49% of those girls who aspired while in high school to careers in medicine, the sciences, or math-computers-engineering eventually chose careers in other fields. 61% of those aspiring early to careers in the health-related professions changed to other career goals, and 86% of those who originally decided to go into non-scientific careers changed their career aspirations.

Third, changes in original career decisions typically occur early. Most of those young women who change to another career area from that decided upon ir high school do so during the last year in high school or the first two years in college. However, about one-third of those choosing careers while in high school in medicine, science, or math-computers-engineering do not decide on new career goals until sometime during the last two years in college.

Table 2 of the handout indicates some personal factors that may mediate these changes in career decisions. Table 2 shows the high and low mean personal factor scores for the several career sub-areas in which these women expected to be five years after the initial data collection.

In comparing any career sub-group on early or final aspirations (Table 1 to Table 2), it is clear, for example, that women aspiring to become physicians, either while in high school or as a final career decision, are marked by a high stable scientific orientation, high perceived ability, and high energetic self-assurance and by low early mathematics interests, low early teaching interests, and low solitary perseverance. Clearly, women without this particular core pattern of personal characteristics do not aspire to become MD's at either time. Those who aspire early to medicine are high on order and neatness and low on feelings of intellectual difference from others, while these are not important qualities of those women whose final career aspirations are in medicine. Similarly, the women whose 5-year aspirations are in medicine, unlike their earlier counterparts, are characterized by a high need for achievement, low dissatisfaction with their own achievement (that is, high achievement satisfaction), and low personal emotional adjustment.

Time precludes further detailed comparisons, but a glance at the career sub-groups in mathematics-computers-engineering, or in teaching, especially, will show striking contrasts to the aspirants to medicine, both in the core patterns and extent of changes in factor scores. Similar comparisons may be made among all the other career groupings.

Finally, let's return full circle to the sociological

measures which characterize those whose final aspirations are to various careers:

Parental socio-economic variables are even more important in predicting permanent career choice than they were for early career decisions; they become increasingly important to these womens' career decisions as the women become older and progress through their higher education and career training. Probably we are looking at a cumulative effect of high or low socio-economic status, with girls from higher status families going to more prestigious colleges, where they are exposed to progressively higher career role expectations, with the opposite probably occurring more often among those women from families with less education and lower incomes.

Daughters of parents (especially fathers) with both more education and higher status occupations are significantly more likely to choose final careers in medicine than are women from families with less education and lower status jobs. Women whose final career choice is in math-computers-engineering are more likely to have parents with some college training rather than parents with either little formal education or with advanced degrees; parents' occupations are not related to math-computers-engineering career choices. Final career choices in the sciences are not related to either parents' educational attainment or occupations. But, even

more than for early career choice, the size (and by inference quality, or perhaps reputation) of the high school attended is very importantly related to permanent career decisions in the sciences, and in medicine; almost twice as many of the women finally going into these fields come from larger high schools, especially those in small-to-moderate sized suburbs or smaller cities. Also, 57% of the top five graduates of larger high schools, but only 37% of the top five graduates of smaller high schools, finally go into medicine, science, or mathematics-computers-engineering.

Exactly the opposite is true for permanent career decisions to become nurses, medical technologists, or elementary-secondary teachers: these women come disproportionately from families with low parental education and low status occupations, from rural areas, small non-suburban towns, or very large cities, and from smaller high schools, all by margins of two- or three-to-one.

Last, the atypicality of the mother's occupation is not related to terminal career choice; the influence of this variable is on early career choice only.

(Vidulich, Sachs, Christman)
SEPA, 1978

TABLE 1

PERSONAL FACTORS ASSOCIATED WITH EARLY CAREER ASPIRATIONS IN HIGH-ABILITY WOMEN

EARLY ASPIRATION	HIGH MEAN FACTOR SCORES	LOW MEAN FACTOR SCORES
MEDICINE	stable scientific orientation energetic self-assurance perceived ability order and neatness (-)	solitary perseverance early mathematics interests early teaching interests feeling intellectually different(-)
SCIENCES	solitary perseverance stable scientific orientation motivation to discover arts-humanities interests (-)	early mathematics interests religious influences maternal motivation
MATHEMATICS-COMPUTERS-ENGINEERING	early mathematics interests * solitary perseverance	motivation to discover * (-) energetic self-assurance * early teaching interests (R) stable scientific orientation (R) need for achievement (R) perceived ability (-) maternal motivation (-)
HEALTH-RELATED PROFESSIONS	religious influences * maternal motivation * stable scientific orientation (-)	early mathematics interests * solitary perseverance * feeling intellectually different * arts-humanities interests * need for achievement motivation to discover (-)
TEACHING	early teaching interests * maternal motivation * early mathematics interests * religious influences order and neatness	motivation to discover arts-humanities interests (-)
ARTS & HUMANITIES	arts-humanities interests * energetic self-assurance * (-) need for achievement (-) motivation to discover (-) feeling intellectually different solitary perseverance (-)	maternal motivation * perceived ability * early mathematics interests
LAW-BUSINESS-GOVERNMENT	need for achievement * (-) religious influences * (-) perceived ability (R) motivation to discover (-) energetic self-assurance (-) arts-humanities interests (-) early mathematics interests feeling intellectually different	maternal motivation * order and neatness * (-) solitary perseverance (-)

* These factors are extremely discrepant from other career sub-groups.
(-) This factor does <u>not</u> appear on Table 2 for this sub-group.
(R) This factor is <u>reversed</u> on Table 2 for this sub-group.

(Vidulich, Sachs, Christman)
SEPA, 1978

TABLE 2

PERSONAL FACTORS ASSOCIATED WITH FUTURE CAREER ASPIRATIONS IN HIGH-ABILITY WOMEN

FUTURE ASPIRATION	HIGH MEAN FACTOR SCORES	LOW MEAN FACTOR SCORES
MEDICINE	perceived ability * energetic self assurance stable scientific orientation need for achievement (+)	early mathematics interests * solitary perseverance early teaching interests dissatisfaction with achievement (+) personal adjustment (+)
SCIENCES	solitary perseverance stable scientific orientation motivation to discover need for achievement (+) heterosexual interests (+)	early mathematics interests religious influences maternal motivation early teaching interests (+)
MATHEMATICS-COMPUTERS-ENGINEERING	early mathematics interests * solitary perseverance * need for achievement (R) order and neatness (+) stable scientific orientation (R) feeling intellectually different (+) early teaching interests (R)	energetic self-assurance religious influences (+) dissatisfaction with achievement (+) personal adjustment (+)
HEALTH-RELATED PROFESSIONS	religious influences * maternal motivation dissatisfaction with achievement (+)	solitary perseverance * arts-humanities interests * early mathematics interests need for achievement feeling intellectually different perceived ability (+) heterosexual interests (+)
TEACHING	early teaching interests * maternal motivation * early mathematics interests religious influences order and neatness personal adjustment (+) dissatisfaction with achievement (+)	motivation to discover * need for achievement * (+) solitary perseverance (+) stable scientific orientation (+) feeling intellectually different (+) heterosexual interests (+)
ARTS & HUMANITIES	arts-humanities interests * feeling intellectually different	order and neatness * (+) perceived ability * stable scientific orientation * (+) early mathematics interests maternal motivation
LAW-BUSINESS-GOVERNMENT	early mathematics interests feeling intellectually different	maternal motivation stable scientific orientation * (+) early teaching interests (+) perceived ability (R)

* These factors are extremely discrepant from other career sub-groups.
(+) This factor does not appear on Table 1 for this sub-group.
(R) This factor is reversed from Table 1 for this sub-group.